REMARKS

Applicants appreciate the thorough review of the present application as reflected in the Official Action mailed November 28, 2003. Applicants also appreciate the indication of allowable subject matter in Claim 1. Applicants have, however, amended Claim 1 to correct an error where the thickness percentage of the dielectric layer was inadvertently identified rather than the thickness of the second oxide layer. Accordingly, Claim 1 and the Specification have been amended to reflect that the percentages apply to the first and third thicknesses. Such an amendment is consistent, for example, with the issued claims in the parent application.

Applicants have also amended Claims 2 and 13 to incorporate the recitations of Claims 4 and 16 respectively without the use of the term "about" and to remove the recitations regarding thickness percentages. Applicants have added new Claims 57 and 58 that depend from Claims 2 and 13 and recite that the thickness of the oxides are at least six times smaller than the thickness of the dielectric layer. Applicants have also added new Claims 59 and 60 that depend from Claims 33 and 40 and recite that the capacitor and interconnect structure are configured to provide an operating voltage of at least 100V. Finally, Applicants have added new independent Claims 61 and 62 that correspond to Claims 2 and 13 with the thickness percentages removed and recite that the capacitor and interconnect structure are configured to provide an operating voltage of at least 100V.

The IDS Materials

Applicants wish to bring to the attention of the Examiner a Supplemental IDS that was filed November 5, 2003 in the present case. For the Examiner's convenience, a copy of the PTO-1449 form and the cited references from the November 5, 2003 supplemental IDS are provided herewith at Tab A. Applicants also wish to bring to the attention of the Examiner a further Supplemental IDS that is submitted concurrently herewith under separate cover. Applicants request that the Examiner consider the materials provided in these IDSs and return an initialed copy of the PTO-1449 forms with any subsequent communication.

The Double Patenting Rejection

Claim 1 stands rejected in light of United States Patent No. 6,246,076 under the judicially created doctrine of double patenting. Official Action, p. 3. Applicants have previously submitted a Terminal Disclaimer with respect to the '076 patent. A copy of that Terminal Disclaimer is provided at Tab B for the Examiner's convenience. Accordingly, Applicants submit that the double patenting rejection has been overcome.

The Obviousness Rejections

Claims 2-21

Claims 2-21 stand rejected under 35 U.S.C. § 103 as obvious in light of Wang, "High-Temperature Characteristics of High-Quality SiC MIS Capacitors with O/N/O Gate Dielectric" (hereinafter "Wang") and United States Patent No. 5,479,316 to Smrtic *et al.* (hereinafter "Smrtic"). Official Action, p. 2. The Official Action indicates that Claims 4 and 5 were rejected because "about" does not structurally distinguish over the prior art. Official Action, p. 2. As noted above, Applicants have amended Claim 2 to remove the recitations regarding thickness percentages and incorporate the recitations of Claim 4 that the oxide thicknesses "are an order of magnitude smaller than" the dielectric thickness. Applicants have made corresponding amendments to Claim 13. Applicants have removed the recitation of "about" and, thus, the claims are structurally distinguished from Wang. Applicants submit that Wang does not disclose that the thickness of the oxides be an order of magnitude smaller than that of the dielectric as Wang describes a thickness of 1/2/1 for the oxide, nitride and oxide. Wang, p. 458, under heading "II. Experiments". Accordingly, Applicants submit that Claims 2 and 13 are patentable over the cited references. Applicants submit that Claims 3-12 and 14-21 are patentable as depending from a patentable base claim.

Claims 33-46

Claims 33-46 stand rejected under 35 U.S.C. § 103 as obvious in light of Wang and Smrtic. Claims 33-46 also stand rejected under 35 U.S.C. § 103 as obvious in light of Dimitrijev, "Nitridation of Silicon-Dioxide Films Grown on 6H Silicon

Carbide" (hereinafter "Dimitrijev") and Smrtic. Applicants will address each of these rejections separately below.

Claims 33-46 each recite a dielectric material that is "silicon oxynitride having a formula $Si_3N_{4-X}O_X$, where $0<X<1$." As discussed in the present specification, silicon oxynitride is defined as an oxygenated nitride. Specification, p. 18, lines 3-5. In particular, the specification states that "[o]xynitride refers to a nitride layer deposited in the presence of an oxygen precursor, such as nitrous oxide (N_2O), thereby introducing oxygen into the layer." Specification, p. 18, lines 3-5. The Official Action relies on Wang or Dimitrijev as teaching these recitations of the claims. Official Action, p. 3.

In contrast to the silicon oxynitride as defined in the present application, Wang describes an ONO structure. Wang describes the use of SiH_4, N_2O and N_2 as precursors for Si, O and N. Wang, p. 458. Wang does not describe the specific sequence of use of the gases, but it appears that N_2O is the precursor for the oxide portion of the ONO stack. Wang does not describe N_2O as being used for formation of the nitride. As such, while Wang may describe a nitridated oxide, it does not appear to describe an oxygenated nitride as is claimed in Claims 33-46. Wang does not provide any material analysis of the ONO stack but provides electrical characteristics of the structure. Accordingly, Applicants submit that Wang does not inherently disclose silicon oxynitride as is recited in Claims 33-46. To the extent that the Examiner disagrees with Applicants' assessment of Wang, Applicants request that the Examiner provide further details as to the bases for the assertion that Wang inherently discloses "silicon oxynitride having a formula $Si_3N_{4-X}O_X$, where $0<X<1$" as recited in Claims 33-46.

As with Wang, Dimitrijev does not describe silicon oxynitride as is recited in Claims 33-46. Dimitrijev describes a nitrided oxide, not an oxygenated nitride. *See* Dimitrijev, Title. It appears the Dimitrijev describes formation of an oxide followed by a nitridaton in either NO or N_2O. Dimitrijev, p. 175. As such, Applicants submit Dimitrijev does not disclose or suggest deposition of a nitride layer in the presence of an oxygen precursor, as Dimitrijev grows an oxide in O_2 and then nitridates that oxide. Accordingly, Applicants submit that the recitations of Claims 33-46 are neither disclosed nor suggested by the cited combination of references.

The New Claims Are Patentable

Applicants have added new Claims 57-62. Claims 57 and 58 are dependent claims that recite that the dielectric is at least six time the thickness of oxide layers. Applicants submit that the 1/2/1 ratios of Wang do not disclose or suggest the recitations of Claims 57 and 58. Accordingly, Applicants submit that Claims 57 and 58 are separately patentable over the cited references for at least these additional reasons.

Claims 59 and 60 are dependent claims and Claims 61 and 62 are independent claims that recite that the capacitor or interconnect structure have an operating voltage of at least 100V. Applicants submit that Dimitijev and Wang relate to MIS structures such as the gates of a transistor, as such, these are relatively low voltage structures where the focus was improving the interface with the silicon carbide layer on which they are formed. In contrast, Claims 59-62 recite that the devices are configured to operate at at least 100V. Applicants submit that the low voltage structures of Wang and Dimitrijev do not disclose or suggest high voltage structures as recited in Claims 59-62. Accordingly, Applicants submit that Claims 59-62 are also patentable over the cited references for at least these reasons.

Conclusion

In light of the above amendments and remarks, Applicants respectfully submit that the above-entitled application is now in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

It is not believed that an extension of time and/or additional fee(s)-including fees for net addition of claims-are required, beyond those that may otherwise be provided for in documents accompanying this paper. In the event, however, that an extension of time is necessary to allow consideration of this paper, such an extension is hereby petitioned under 37 C.F.R. §1.136(a). Any additional fees believed to be due in connection with this paper may be charged to our Deposit Account No. 50-0220.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on February 26, 2004.

Traci A. Brown
Date of Signature: February 26, 2004